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High Incidence of Meningococcal Disease in Southwest Missouri in 1995

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Background

Within a five-week period between March and April of 1995, three cases of meningococcal serogroup C meningitis occurred in the city of Joplin (which lies in both Jasper and Newton counties). These cases represented a rate of 7.34 cases of meningococcal disease per 100,000 population, seven times higher than the endemic rate of meningococcal disease in the United States. Since the three cases were caused by serogroup C meningococci, for which a vaccine is available, the possibility of community vaccination to prevent further cases was considered. However, case investigation by the Joplin City Health Department evidenced a lack of common interaction between the cases. In addition, the rate of meningococcal disease (7.34 cases per 100,000) was below the Centers for Disease Control and Prevention (CDC) guideline of 10-15 cases per 100,000 population for potential use of vaccine. Consequently, mass vaccination was not recommended at that time.

No further cases of meningococcal disease occurred within the city of Joplin until three months later, when a case of serogroup B meningococcal meningitis was reported in a 7-year-old with an onset date of July 28, 1995. The upward trend of the disease continued and by the end of 1995, a total of nine cases had occurred in Joplin, for a rate of 22.02 cases per 100,000 population. Of the nine cases, seven were from Jasper County and two were from Newton County. When an adjoining county, McDonald (south of Newton County), was included in the count, a total of 15 cases had occurred in the three-county area between March 1, 1995 and March 31, 1996. Close monitoring of the disease and consultation with CDC occurred throughout the year. Additional investigation of cases continued to show no correlation between cases (no common source or interaction). Also, the geographic distribution of the cases by residence was widely dispersed rather than clustered together.

Due to seven cases being serogroup B, CDC requested the isolates for enzyme typing. All seven were the same enzyme type (#566) not previously identified by the CDC. In February 1996, the Missouri Department of Health requested and the CDC sent an Epidemic Intelligence Service (EIS) Officer, who was accompanied by a medical student, to further investigate case findings and to conduct a case-control study to identify possible risk factors for disease. The CDC investigation, in cooperation with state, city and county health agency staff, began the week of March 18, 1996.

Health departments in the neighboring states of Kansas, Oklahoma and Arkansas were contacted regarding meningococcal disease occurring in counties adjoining Newton, Jasper and McDonald in Missouri. Ottawa County in northeast Oklahoma reported two cases and Benton County in northwest Arkansas reported six cases. The southeast corner of Kansas reported no cases. A total of 23 cases of meningococcal disease had occurred between March 1, 1995 and March 31, 1996 in the five-county area. State and city health agency staff from Missouri, Arkansas and Oklahoma joined CDC staff in the investigation of these additional cases.

Case-control study

Methods

To identify risk factors for meningococcal disease, a case-control study was

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conducted using the 23 cases occurring between March 1, 1995 and March 31, 1996. A case of meningococcal disease was defined either by isolation of *Neisseria meningitidis* from cerebrospinal fluid (CSF) or blood culture, or a CSF or blood latex agglutination test positive for *N. meningitidis*. Three controls for each case were selected through a house-to-house search and matched according to age and neighborhood of residence at the time of illness. A standardized face-to-face questionnaire was administered to all 23 cases (or parent of case) and 67 neighborhood controls (or parent of the control). Participants were asked about potential exposures.

In addition, available medical records of all cases in the five-county area who were reported to have meningococcal disease were reviewed to assess clinical manifestations of the illness.

Statistical Analysis

Data were collected on standardized forms. Data entry and univariate analysis were performed using Epi Info version 6.01 (CDC, Atlanta, GA). Categorical variables were compared using the chi-square or Fisher's exact test. Continuous variables were evaluated using the Kruskal-Wallis test for the comparison of means. Crowding within the house was calculated by creating a variable of the number of people per room. This variable was divided into quartiles and the quartiles were correlated with disease. Odds ratios, 95 percent confidence intervals and p-values were calculated for the case-control study.

Results

Between March 1, 1995 and March 31, 1996, there were 23 cases of meningococcal disease in the study area; 10 (43%) were serogroup B isolates. See Figure 1. Among the ten serogroup B cases, only two (20%) were positive by the latex agglutination test. All of these serogroup B isolates were identical by enzyme-typing. This enzyme-type, designated ET-566 by CDC laboratory numbering system, had not been previously identified. Ten of the 23 isolates were serogroup C, and three isolates were classified by the state laboratories as undetermined serogroup. Serogroup C isolates were of different enzyme types. Three of the ten (30%) serogroup B cases and four of the ten (40%) serogroup C cases were fatal. One of the three undetermined cases was also fatal. There was an overall case fatality rate of 35 percent.

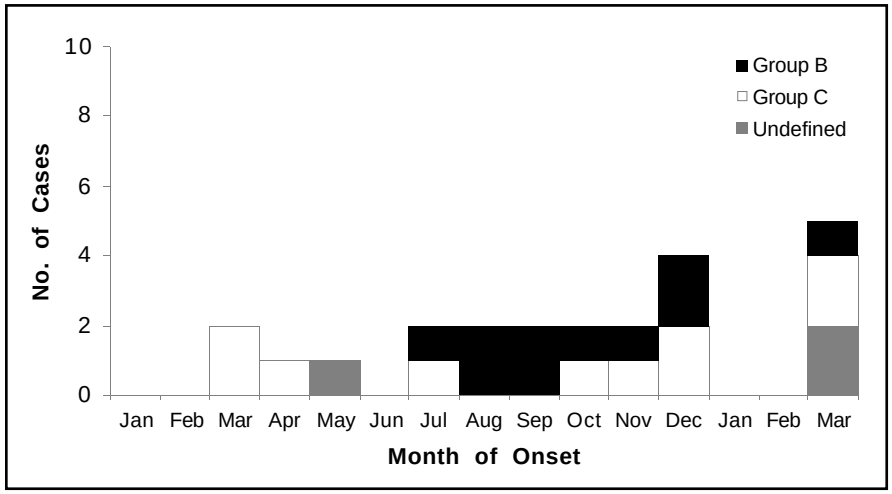

Figure 1. Cases of meningococcal meningitis in five contiguous counties in southwest Missouri, northeast Oklahoma and northwest Arkansas, 1995–96.

Eighteen (78%) of the cases were male. The ages of cases ranged from 2 months to 42 years. About 57 percent were older than 5 years of age. No common organizational exposures (e.g., schools, universities, places of employment) were discovered among the cases.

Results of the univariate analysis showed that among children less than 18 years of age, having a mother that smoked cigarettes was a significant risk factor (Odds Ratio [OR]=5.2, 95% confidence interval [CI]=1.4-19.8). Having at least one family member who smoked cigarettes approached significance as a risk factor (OR=3.3, 95%CI=0.9-12.7). Also, among cases less than 18 years old, not being insured (OR=6.8, 95%CI=1.4-34.2) and mother's education less than high school (OR=4.3, 95%CI=1.3-14.7) were both risk factors for disease. Crowding approached significance as a risk factor for disease among children, (OR=3.3, 95%CI=0.9-12.0), when the upper quartile, ≥0.8 people per room, is compared to the lower three quartiles, <0.8 people per room.

When adults and children were analyzed together in the case-control study, an upper respiratory infection in the two weeks preceding the onset of meningococcal disease was significantly associated with disease (OR=3.0, 95%CI=1.0-9.4). Males were 1.4 times (95%CI=1.1-2.2) more likely than females to experience disease, and household size (>5 members) was larger among cases than controls (OR=4.4, 95%CI=1.1-18.2).

Discussion

This represents a community outbreak within a five-county area in southwest Missouri, northwest Arkansas and northeast Oklahoma. The outbreak was caused by the circulation of both serogroup B and C disease. While the serogroup C isolates were of multiple enzyme types, the serogroup B disease was linked to a single enzyme type, ET-566. This enzyme type has not been previously described in association with outbreaks of meningococcal disease.

There are several hypotheses for the increased rate of both serogroup B and serogroup C meningococcal disease. First, the introduction of the "new"

serogroup B ET-566 strain might have resulted in increased disease, since this enzyme type might be associated with a set of antigenic determinants that the population had not previously been exposed to. Secondly, the finding of a correlation with upper respiratory disease is consistent with other outbreaks. The correlation between influenza and meningococcal outbreaks have been described in previous studies.[1,2] Missouri surveillance for flu-like illness revealed a particularly severe and early influenza season in 1995. Serologic studies are underway to evaluate the possible contribution of influenza virus to the community outbreak.

The risk factors identified in the neighborhood case-control study are consistent with other studies. Low socioeconomic status, smoking, and for children, living with adult smokers, have all been previously described as risk factors for meningococcal disease. On July 16, 1996, the CDC issued their final report with the following four recommendations:

- The health care community in the affected area should be informed of the increased rate of meningococcal disease in the community and be advised to have a high index of suspicion for meningococcal disease among febrile persons.
- Based on the finding that eight of ten serogroup B cases were negative by the agglutination test, it is important to remind physicians that this test is NOT useful for the diagnosis of meningococcal disease. Treatment should be based on clinical signs and suspicion of meningococcal disease. Clear CSF does NOT indicate the absence of meningococcal disease.
- The rates of serogroup C meningococcal disease should be carefully monitored to determine the potential utility of a community vaccination campaign.
- Public health education campaigns concerning meningococcal disease should include information on the risk of smoking to the health of children.

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Meningococcal Disease*

Meningococcal disease is a severe bacterial infection caused by the germ, *Neisseria meningitidis*. This germ has several serogroups (A, B, C, W-135, X, Y, and Z). Generally, the disease occurs in the winter and spring. However, sporadic cases can occur throughout the year. At any given time, 5–10 percent of the population may carry this germ in their nose and throat without any signs of illness. Others develop serious symptoms.

Anyone can get meningococcal disease, but it is more common in infants, children and young adults. Susceptibility decreases with age. Children exposed to tobacco smoke are at higher risk for respiratory illness, including meningitis. Individuals lacking certain complement components are at risk to contract or experience recurrence of this disease. When this bacteria affects the meninges (a thin layer of tissue covering the brain and spinal cord), it is call meningococcal meningitis.

The disease is characterized by sudden onset of fever with severe headaches, nausea and/or vomiting, stiff neck, with or without a purplish rash, confusion, and coma. Symptoms may appear 2 to 10 days following exposure, but usually within 3 to 4 days.

A person may transmit the meningococcal bacterium from the time he/she is first infected until the germ is no longer present in discharges from the nose and throat. Disease spread requires direct contact (including spray from coughing) with these discharges. Persons are usually no longer infectious after 24 hours of effective antibiotic treatment—usually penicillin, however, other antibiotics can also be effective in treating this disease.

Persons who have been in close contact (household members, intimate contacts, child care centers or nursery school playmates and health care personnel performing mouth to mouth rescue breathing, intubation or deep suctioning) should receive preventive antibiotic treatment. Casual contact as might occur in a regular classroom, office, or factory setting usually does not warrant preventive treatment.

Presently, there is a vaccine that will protect persons against four of the seven serogroups (NOT B, X or Z) of meningococcus. Unfortunately, it can not be administered to children under 2 years of age. In addition, the duration of protection in young children is less than two years. Vaccination is recommended in outbreak situations (must be correct strain), for individuals with specific medical conditions (e.g., anatomic or functional asplenia and terminal complement deficiency) and for those travelling to areas of the world where the disease is more common.

Diagnosis and Treatment Guidelines for Urinary Tract Infections in Long-Term Care Facilities: When should one perform cultures? Do all positive cultures require treatment?

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Scope of the Problem

In residents of long-term care facilities (LTCFs), urinary tract infections (UTIs) are the most common bacterial infection. The urinary tract is also the most common source of bacteremia in elderly patients in LTCFs, which results in significant mortality.

Positive urine cultures are common in the elderly, occurring in up to 50 percent of those who are debilitated and in virtually 100 percent of patients with long-term bladder catheters. Most elderly patients with positive urine cultures have no symptoms of UTI. If these patients have a significant level of bacteria in the urine, the infection is called asymptomatic bacteriuria. Bacteriuria is defined as a culture growing >100,000 colonies of bacteria per ml. of urine. Cultures growing a single organism at this level are highly specific for true infection.

In non-catheterized ambulatory persons over the age of 80 living outside LTCFs, asymptomatic bacteriuria is present in 10-15 percent of men and women. However, the incidence of asymptomatic bacteriuria in debilitated, non-catheterized residents in LTCFs approaches 50 percent. Several placebo-controlled studies have shown that treating asymptomatic bacteriuria with antibiotics is of little benefit. In fact, antibiotics may be harmful. Treated patients have a slightly decreased risk of developing symptomatic UTI for a few weeks after treatment, but by six weeks, asymptomatic bacteriuria is present at the same rate in treated and untreated patients. In debilitated residents in LTCFs, treatment with antibiotics does not affect long-term mortality, and does not alter incontinence in chronically incontinent patients.

Clinical studies support the fact that in a patient without signs or symptoms of UTI, a urine culture should not be performed. Furthermore, a patient without urinary tract symptoms or signs should not be treated for a positive culture for the following reasons:

- It's difficult to make an asymptomatic patient feel better;
- The risk of adverse drug reactions or drug-drug interactions;
- Treating the patient's positive culture has minimal clinical benefit;
- Unnecessary antibiotic therapy promotes the development and spread of antibiotic-resistant bacteria.

Urine cultures should be obtained in the elderly patient with urinary tract symptoms (frequency, dysuria, suprapubic pain, pyuria, or new or worsening incontinence) or with suspected sepsis. Empirical therapy with antibiotics is appropriate in the patient with symptoms of cystitis and pyuria, but with no fever or signs of toxicity. Unfortunately, because of the spread of antibiotic resistance in the community, the old reliable drugs like amoxicillin, nitrofurantoin and sulfa drugs alone will fail up to one-third of the time. For initial empirical treatment of cystitis, the current drug of choice is trimethoprim/sulfamethoxazole. In sulfa-allergic patients, either trimethoprim alone (100 mg. bid) or a quinolone antibiotic should be used. For simple cystitis, a three-day course of antibiotics works as well as seven days and is more effective than one-dose therapy. In older males with frequent recurrences of cystitis, chronic bacterial prostatitis should be suspected. Patients with chronic bacterial prostatitis are often cured with a four-week course of a quinolone because of the superior penetration of these drugs into the prostate tissue.

Sepsis in the elderly often presents atypically. Fever may be low grade, absent or patients may actually become hypothermic. Frequently, the only sign is a decrease in mental status. The urinary tract is the most common source of gram-negative bacteremia. Cultures of blood and urine should be obtained and broad spectrum parenteral antibiotics with good gram-negative coverage, like third generation cephalosporins, extended spectrum penicillins, or quinolones, should be administered to the elderly patient with suspected sepsis pending the results of cultures.

Catheter-Associated Urinary Tract Infections

Ten percent or more of residents in LTCFs have long-term indwelling bladder catheters. Urine cultures are positive virtually 100 percent of the time in patients with chronic catheters. Often, these cultures contain multiple species of organisms. In these patients, the urinary tract is the most common source of gram-negative sepsis. When these patients appear septic, cultures of blood and urine should be performed, and empirical parenteral antibiotic therapy started. This therapy should include broad coverage for gram-negative rods, such as pseudomonas like ceftazidime, piperacillin, aminoglycosides or ciprofloxacin.

On the other hand, urine cultures should not be performed on the patient with a chronic catheter who has no local or systemic symptoms of UTI. Again, the cultures will always be positive, and

more importantly, positive cultures without symptoms should not be treated with antibiotics, so why culture? There are several good reasons not to treat these patients:

- One can never sterilize the urine of a patient with a chronic catheter; the susceptible bacteria that you treat are rapidly replaced with resistant organisms;
- When patients with chronic catheters who have received antibiotics develop symptomatic infections or urosepsis, they invariably have resistant bacteria which are usually more difficult and expensive to treat;
- Patients with chronic catheters who have been treated with antibiotics often become a reservoir for resistant bacteria like methicillin resistant *Staphylococcus aureus*, vancomycin resistant enterococci, multiply resistant gram-negative rods and yeast, which can spread to other patients in their environment.

Attempts at preventive or prophylactic therapy in patients with chronic catheters will have a similar effect on the selection of resistant organisms. Reduction in morbidity from catheter-related infections is best achieved through good infection control practices. First, does the patient really need a chronic catheter? Patients who can empty their bladders can be managed with diapers or with external urinary catheters in males. The disadvantages of these approaches include problems related to skin breakdown problems on the penis, perineum or sacral regions and must be weighed against the risks associated with catheterization. Strict adherence to closed drainage systems and periodic catheter changes help to reduce the incidence of infection. Also, good handwashing by health care workers and avoidance of using common collecting vessels when emptying collection bags will help reduce the spread of pathogens from patient to patient.

Summary: The Main Take-Home Points for Treating UTIs in LTCFs

- Bacteriuria is common in elderly persons and is universal in those with long-term bladder catheters.
- In most instances, bacteriuria is asymptomatic in this population.
- Antibiotic treatment of asymptomatic bacteriuria is of no benefit, and in fact, may be harmful.
- Do not perform urine cultures on asymptomatic patients.
- Patients with local or systemic signs or symptoms of UTI should have urine cultures performed and receive appropriate therapy based on culture results.

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Nicolle LE. Prevention and treatment of urinary catheter-related infections in older patients. Drugs & Aging 1994;4: 379–91.

To Our Readers...

Re: Division Name Change

We are pleased to announce our new name, the Division of Environmental Health and Communicable Disease Prevention. The change was effective September 19, 1996. We were formerly known as the Division of Environmental Health and Epidemiology. Bureaus in this division are: Tuberculosis Control, Communicable Disease Control, Veterinary Public Health, Immunization, STD/HIV Prevention, Community Environmental Health and Environmental Epidemiology.

Our new name reflects our mission, which is to protect and promote the public's health by:

- assessing indicators of communicable disease and environmental hazards;
- assuring access to disease prevention, intervention and environmental assessment services;
- developing policies and regulations;
- educating the public and promoting healthy behaviors; and
- collaborating with public and private entities.

Reducing Unintended Pregnancies in Missouri

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Over half of the pregnancies in the United States are unintended at the time of conception.[1] Unintended pregnancies include those which occur earlier than desired and pregnancies which are wanted neither at the time of occurrence nor at some future time. The basis of many contemporary reproductive issues, such as teen pregnancy, nonmarital pregnancy and abortion, lies in the frequency of unintended conception. A primary goal of the state in providing family planning services is the reduction of unintended pregnancies in Missouri. See related article on family planning on pages 8–10 and 23 of this issue.

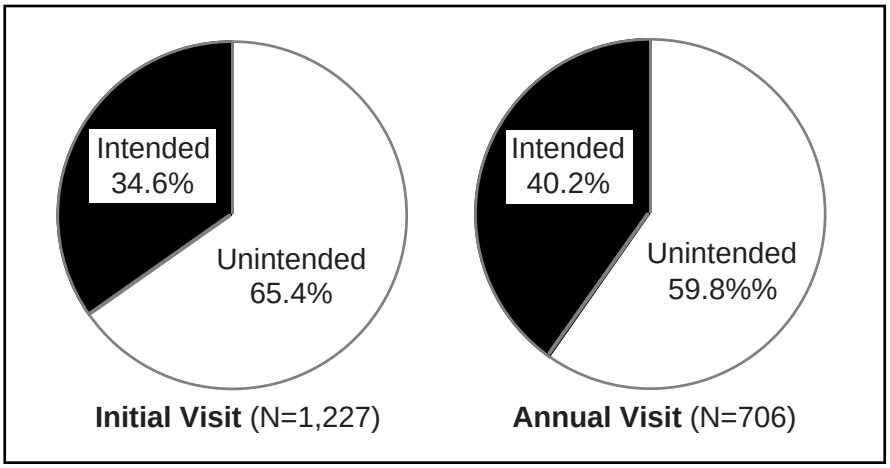

Figure 1. Family planning clients pregnant within past year by intentionality of pregnancy, Missouri, fiscal year 1995.

Intentionality of Pregnancy

Family planning data from general revenue and Title V funded clinics outside the major metropolitan areas* provide information on initial and annual visits made to family planning clinics from July 1994 through June 1995. Although these data will not allow us to directly assess the reduction of unintended pregnancies in Missouri, we can examine intentionality of pregnancy and change in contraceptive practices. Clients making initial visits are assumed to be entering the family planning system while those making annual visits are already participating in the system.

Of all clients making an initial or annual visit to a family planning clinic, approximately 12 percent (2,213) had been pregnant in the 12 months preceding the visit. Of these pregnancies, 32 percent were intended and 55 percent were unintended with pregnancy intention unknown for the remaining pregnancies. Clients making an initial visit to a family planning clinic had a higher rate of unintended pregnancy than did clients making an annual visit. Nearly two-thirds of the clients with a pregnancy during the previous 12 months were making an initial visit to the clinic. Figure 1 shows the breakdown by type of visit and intentionality for those clients with a pregnancy within the past year. As Figure 1 indicates, not only did those women making an initial visit have more pregnancies, but also more of these pregnancies were unintended than were those of the women making an annual visit. Nevertheless, it is important to note that the majority of pregnancies were unintended even for those making an annual visit. Table 1 presents pregnancy rates by type of visit. Women making an initial visit to a family planning clinic had a much higher rate of pregnancy (200.0 per 1,000 females) than did women making an annual visit. This latter rate (73.1) was close to the overall state rate of 74.4 pregnancies per 1,000 females of childbearing age (defined as ages 15 through 44).

Table 1. Pregnancy Rates in Family Planning Clients Pregnant Within Past Year by Type of Visit, Missouri, Fiscal Year 1995

Type of Visit	Number	Rate per 1,000 Females
Initial	1,361	200.0
Annual	852	73.1
Overall State		74.4

Contraceptive Practice Change and Pregnancies Averted

A measure of family planning impact is change in contraceptive practice. The contraceptive methods used by the client before and after the visit are compared in Table 2. Of all clients making an initial or annual visit, nearly 2,000 were not using any method of contraception prior to the visit. Nearly 75 percent of these clients began using a prescription-based method and an additional six percent began using an over-the-counter method. Also, of those clients making an initial or annual visit with prior use of an over-the-counter method, over 75 percent changed to a prescription-based method. Clients who had been pregnant within the past year and had not been using a contraceptive were even more likely to adopt a prescription-based method (81.2%). Ninety percent of all clients chose one of the more-effective (prescription-based) methods as their contraceptive following the family planning visit.

*Title V clinics in St Louis City, St Louis County and Kansas City only furnished aggregate data for fiscal year 1995 but will be providing individual client data beginning in fiscal year 1996.

Table 2. Family Planning Clients by Type of Visit and Contraceptive Method, Missouri, Fiscal Year 1995

Method Prior to Family Planning Visit	Method Following Family Planning Visit								
	Total	No Method*		Over-the-Counter Method**		Prescription-Based Method***		Sterilization	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
No Method*	**1,683**	331	19.7	108	6.4	1,242	73.7	2	0.1
Over-the-Counter**	**4,168**	41	1.0	930	22.3	3,191	76.5	6	0.1
Prescription-Based***	**11,327**	64	0.6	118	1.0	11,133	98.2	12	0.1
Total	**17,178**	**436**	**2.5**	**1,156**	**6.7**	**15,566**	**90.6**	**20**	**0.1**

* Excluding those pregnant or seeking pregnancy.
** Over-the-counter methods include abstinence, natural family planning, withdrawal, condom, condom with spermicide, contraceptive foam, jelly or cream and contraceptive sponge.
*** Prescription-based methods include oral contraceptive, cervical cap, IUD, Depo Provera, Norplant and diaphragm.

Forrest and Singh estimate that "For every 1,000 women using reversible contraceptives and relying on a publicly funded provider, 260 unintended pregnancies are prevented, including 112 live births and 114 induced abortions with the remainder being spontaneous abortions and stillbirths."[2] Of the 18,464 females who utilized family planning clinics either for an initial or annual visit, 90.4 percent (16,689) were using a reversible contraceptive method after the visit. Applying Forrest and Singh's estimate to the 16,689 would suggest 4,339 averted pregnancies, including 1,869 live births, 1,903 induced abortions and 567 spontaneous abortions and stillbirths.

Discussion

Unintended pregnancies, pregnancies occurring earlier than desired or not wanted at even some future date, account for over half the pregnancies in Missouri and the United States. A key aim of family planning programs is to enable women to better control their fertility through delaying or preventing pregnancy. In this report, data from family planning programs funded by general revenue funds and Title V were used to examine the impact of family planning on pregnancy intention and contraceptive practice.

Clients entering into the family planning program were nearly three times more likely to have had a pregnancy during the past twelve months than were women already part of the system. Ninety percent of all family planning clients left their family planning visit using a prescription-based contraceptive. In addition, using a method advocated by Forrest & Singh,[2] it is estimated that 4,339 pregnancies were averted among the females who utilized these publicly funded family planning clinics.

REFERENCES:

1. Institute of Medicine. The best intentions: Unintended pregnancy and the well-being of children and families. Washington, DC: National Academy Press, 1995.
2. Forrest JD, Singh S. Public-sector savings resulting from expenditures for contraceptive services. Family Planning Perspectives 1990;22:1,6–15.

Immunizations Required for School Attendance 1997–98 School Year

Legislation was passed on August 16, 1996 which requires three doses of hepatitis B vaccine for all students entering kindergarten beginning with the 1997-98 school year.

In addition to hepatitis B, students in kindergarten through seventh grade are required to have two doses of measles containing vaccine (MMR, MR or measles vaccine) and must have received the last dose of polio, diphtheria, and tetanus on or after their fourth birthday.

Students kindergarten through first grade must also have received the last dose of pertussis on or after their fourth birthday.

Family Planning Services in Missouri

Vicky Howell, Ph.D.
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Need for Family Planning Services

Unintended pregnancy, especially unintended childbearing, has important consequences not only for the individuals involved but also for the society as a whole. Decreased life opportunities and/or economic hardship affects the individual woman giving birth as the result of an unintended pregnancy, and also leads to increasing demands on public services. Higher rates of low birth weight, infant mortality, inadequate prenatal care, and maternal engagement in harmful behaviors such as substance abuse are all associated with unintended pregnancies.[1] Figures 1 and 2 illustrate the trend over time of some major indicators of unintended pregnancies. Consequently, the provision of services to individuals enabling control over fertility is an important public concern. See related article on reducing unintended pregnancies on pages 6 and 7 of this issue.

The proportion of pregnancies in the United States that are unintended is high—57.3 percent in 1987.[2] Half of these unintended pregnancies end in induced terminations and half result in a live birth.[1] The proportion of births resulting from unintended pregnancies increased from 37 percent in 1982 to 44 percent in 1990.[1] In Missouri, the proportion of births resulting from unintended pregnancies may be even higher. The National Institute of Child Health and Human Development/Missouri Maternal and Infant Health Survey, a case-control study of women who gave birth between December 1, 1989 and March 31, 1991, found that over 50 percent of all births were unintended.[3]

Provision of family planning services to women at risk of unintended pregnancy thus becomes of vital importance. Missouri is close to the national estimated rate[4] for both the percentages of all women (13–44) at risk of unintended

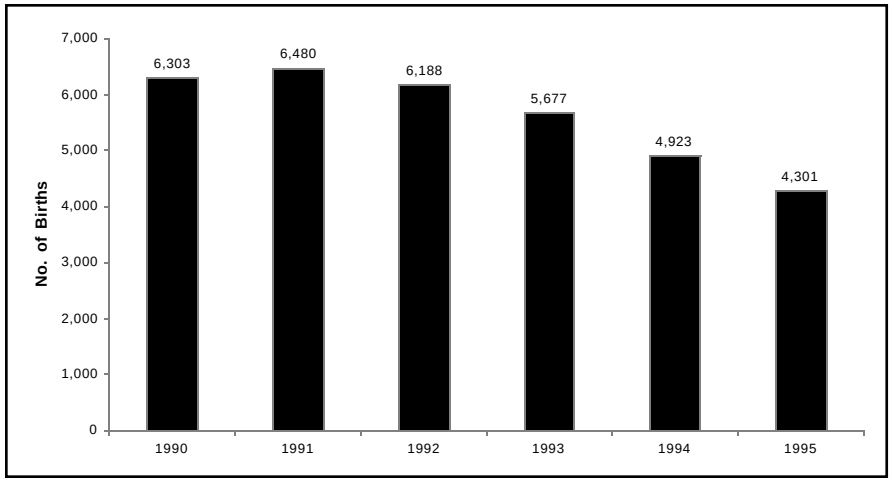

Figure 1. Births spaced less then 18 months apart by year, Missouri, 1990–95.

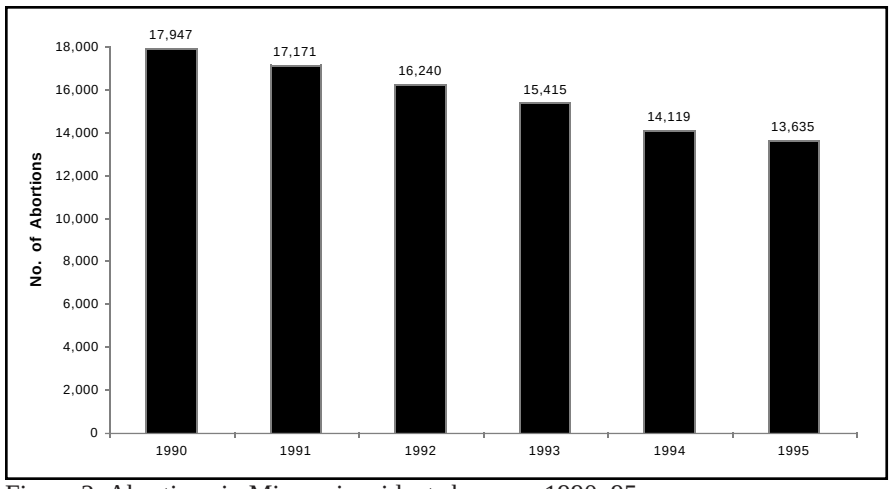

Figure 2. Abortions in Missouri residents by year, 1990–95.

Table 1. Family Planning Female Clientele by Age and Type of Visit, Missouri, Fiscal Year 1995

Age	Initial Visit Number	Initial Visit Percent	Annual Visit Number	Annual Visit Percent	Total Visits Number	Total Visits Percent
<15	212	3.1	79	0.7	291	1.6
15-17	1,483	21.8	1,063	9.1	2,546	13.8
18-19	1,022	15.0	1,315	11.3	2,337	12.7
20-24	1,791	26.3	3,415	29.3	5,206	28.2
25-29	966	14.2	2,367	20.3	3,333	18.0
30-34	650	9.6	1,914	16.4	2,564	13.9
35-39	323	4.8	887	7.6	1,210	6.6
40-50	196	2.9	352	3.0	548	3.0
Unknown	161	2.4	268	2.3	429	2.3
Total	**6,804**	**100.0**	**11,660**	**100.0**	**18,464**	**100.0**

pregnancy (48.4 Missouri, 49.4 United States) and of all women in need of organized or subsidized contraceptive services (25.6 Missouri, 24.4 United States). In this report we look at family planning data reported by clinics funded through General Revenue (GR) funds and many clinics funded by Title V. Individual client data was not provided by Title V clinics in St. Louis City, St. Louis County and Kansas City. Also, this file does not contain client data for other publicly funded family planning sources (e.g., Medicaid, Title X, Federal 330 and 329 clinics). Because of these shortfalls in data completeness, minorities, who mostly reside in Missouri's major cities, are under represented in this file. (St. Louis City, St. Louis County and Kansas City will be providing individual data beginning in fiscal year 1996.)

Table 2. Family Planning Female Clientele by Race and Type of Visit, Missouri, Fiscal Year 1995

Race	Initial Visit Number	Initial Visit Percent	Annual Visit Number	Annual Visit Percent	Total Visits Number	Total Visits Percent
White	6,055	89.0	10,348	88.7	16,403	88.8
African American	604	8.9	1,205	10.3	1,809	9.8
American Indian	27	0.4	14	0.1	41	0.2
Asian/Pacific Islander	31	0.5	33	0.3	64	0.3
Other	87	1.3	60	0.5	147	0.8
Total	**6,804**	**100.0**	**11,660**	**100.0**	**18,464**	**100.0**

Table 3. Selected Characteristics of Family Planning Female Clientele by Type of Visit, Missouri, Fiscal Year 1995

	Initial Visit Number	Initial Visit Percent	Annual Visit Number	Annual Visit Percent	Total Visits Number	Total Visits Percent
Education						
<9 yrs.	372	5.5	233	2.0	605	3.3
9–11 yrs.	2,010	29.5	2,142	18.4	4,152	22.5
12 yrs.	2,734	40.2	6,052	51.9	8,786	47.6
13–17 yrs.	1,093	16.1	2,356	20.2	3,449	18.7
Unknown	595	8.7	877	7.5	1,472	8.0
Current Student						
Yes	2,207	32.4	2,491	21.4	4,698	25.4
No	4,597	67.6	9,169	78.6	13,766	74.6
Marital Status						
Married	1,999	29.4	4,548	39.0	6,547	35.5
Never Married	4,031	59.2	5,723	49.1	9,754	52.8
Divorced	494	7.3	1,061	9.1	1,555	8.4
Separated	209	3.1	255	2.2	464	2.5
Widowed	71	1.0	73	0.6	144	0.8
Poverty Status						
<=100%	2,815	41.4	3,938	33.8	6,753	36.6
101–150%	1,614	23.7	3,539	30.3	5,153	27.9
151–250%	695	10.2	1,667	14.3	2,362	12.8
>250%	866	12.7	1,262	10.8	2,128	11.5
Unknown	814	12.0	1,254	10.8	2,068	11.2
Total	**6,804**	**100.0**	**11,660**	**100.0**	**18,464**	**100.0**

Description of GR/Title V Family Planning Clientele

Between July 1994 and June 1995, 18,464 females made an initial or annual visit to a family planning clinic. Of these, nearly 7,000 were initial visits. Although all women with unimpaired fertility are at risk of unintended pregnancy, incidence is higher among certain groups of women. Females at either end of the reproductive age spectrum (<20 or >39), unmarried women and poor women have higher rates of unintended pregnancy than do women 20-39 years of age, married women and women with incomes greater than 200 percent of the poverty level.[2] Tables 1–3 present the demographics of the clientele utilizing family planning services.

An examination of the data reveals that those females making an initial visit to a family planning clinic are more likely to fall into those groups most at risk of an unintended pregnancy. As Table 1 indicates, nearly 40 percent of the clientele making an initial visit to a family planning clinic are under the age of 20 compared to 21 percent of those returning for an annual visit. Since the data do not include the largest urban areas in the state, the clientele is predominantly white as shown in Table 2. Thirty-five percent of the clients at an initial visit have less than a high school education compared to 20 percent of the females at an annual visit. Only 30 percent of the women making an initial visit are married compared to nearly 40 percent of those at an annual visit. Concomitant with these

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characteristics of youth, unmarried and low education, 41 percent of the clientele at an initial visit have incomes at or below 100 percent of the federal poverty level compared to slightly less than 34 percent at annual visits

There are differences in service characteristics by type of visit. A higher percentage of women making an annual visit to a family planning clinic chose one of the more effective (prescription-based) contraceptives than did women making an initial visit. Although the prescription-based contraceptives are more effective in preventing pregnancy than the less effective (over-the-counter) methods not requiring visits to a medical provider, they are not effective in preventing sexually transmitted diseases, including HIV infection. Over 90 percent of the female clients leaving the clinic after a family planning visit, do so with one of the more effective prescription-based means of contraception. Although it is important to determine if secondary methods are being employed to lessen the transmission of STD/HIV infection, due to incomplete data not much can be said other than that condoms appear to be the most selected secondary method. Missing and incomplete data also hampers obtaining a clear indication of why women leave a visit to a family planning clinic without a contraceptive. Only 35–40 percent of the clients leaving either an initial or annual visit without a method of contraception have a specific reason, such as seeking pregnancy, noted on their record.

As women reach their 30s, methods of contraception change with a decrease in prescription-based methods and an increase in the choice of sterilization or no contraception as women either achieve their desired family size or confront the necessity of doing so amidst declining fertility. After the age of 35, the use of less effective over-the-counter contraceptive methods reflects the lower risks as fertility decreases. Among women age 40 or over, nearly a third have chosen sterilization either of self or partner as a means of contraception.

For all women making a family planning visit, current student status corresponds with a higher rate of choosing one of the more effective prescription-based methods; although, completed years of education do not appear to be related to contraceptive choice. However, for women making an initial visit, those completing at least 12 years of education were more likely to choose an over-the-counter-method than were women with less than 12 years of education. Whites and never married women are also more likely to choose prescription-based contraceptives. Poverty status seems clearly related to the choice of the less effective, over-the-counter contraceptives; clients closest to the poverty level were more likely to choose that method. Women with incomes greater than 250 percent of poverty were less likely to choose an over-the-counter contraceptive at initial and annual visits than were women at any other level of income. Poverty status may also help explain the different pattern of contraceptive choice by African Americans and whites. African Americans are more likely than are whites to use no method of contraception or to use a less effective over-the-counter method or sterilization.

High-Risk Group

Public family planning services are set up to address the fertility needs of all women in the fertility range. However, there are particular segments of that population that are at higher risk of having an unintended pregnancy than others. As noted previously, these groups include women under the age of 20, over the age of 39, those never married, those living with income below the poverty level and non-teenaged women with less than a high school education.

Women having one or more of the above noted high risk factors accounted for 81.8 percent of all initial visits, 71.6 percent of all annual visits and 75.4 percent of total visits. This indicates that the services are being utilized by those at highest risk for an unintended pregnancy. If complete data by county were available for all clients served by public family planning programs (including Medicaid), we could potentially come up with an indicator of met-need. (For example: divide the number of women served at less than 150% poverty level by the number of women in the in-need population and multiply that by 100.) This would give some idea of completeness of coverage, which is not currently available.

Among the high risk group, 70 percent are using birth control pills as their primary means of contraception with usage of Depo Provera by 13.5 percent, condoms by 5.2 percent and sterilization by 3.6 percent. A further breakdown indicates that teenagers are more likely to choose the birth control pill (76.7%) or Depo Provera (14.9%). Women 39 or older (24.3%) and non-teenaged women with less than a high school education (60.4%) are among those least likely to use birth control pills and most likely to use condoms or sterilization as their primary means of contraception. Never married women are likely to choose oral contraceptives (74.7%). Women below the poverty level are the most likely high risk groups to report using Depo Provera (15.5%).

Initial visit high risk clients were more likely to use Depo Provera as their primary method of birth control than are women making annual visits with 15.8 and 12.0 percent reported, respectively. This higher usage of Depo Provera at the initial visit rather than the annual visit is the case for all the categories that make up the high risk group. Depo Provera is less client dependent than most other methods of contraception, which may make it more suitable for these clients.

Conclusion

The chief measure of a program's effectiveness is whether it accomplishes stated goals. Although we lack complete data for the state, it appears that the family planning program is meeting the goal of enabling women to better control their fertility through averting and/or delaying pregnancy. Corresponding to the increased aid to family planning programs has been a decrease in abortions

(continued on page 23)

Information for Foreign Travel

Americans love to travel, and it seems more and more are traveling to not only the popular places in the world like England, France and Spain, but to exotic areas as well, such as rural Africa and Asia. Although travel to the developed areas of the world normally poses no risk of disease to travelers, when passing through or staying in developing countries, disease risk can increase.

Vaccines for protection against tetanus/diphtheria, measles/mumps/rubella, hepatitis A and hepatitis B can easily be obtained from many physicians, and all travelers should check to assure they are up-to-date on these vaccines. Malaria prophylaxis may be obtained by prescription from physicians as well, although it may be necessary to determine if the country to be visited has chloroquine-resistant malaria. Vaccine to protect against yellow fever can only be obtained from a yellow fever vaccination center.

Because some countries require vaccination against yellow fever only if a traveler arrives from a country infected with this disease, it is essential that current information regarding infected areas be taken into consideration in determining whether vaccinations are required. Yellow fever vaccination centers should always be consulted well in advance of travel to determine the requirement of countries to be visited. Also, the centers can provide additional information on the need for malaria prophylaxis.

The Bureau of Immunization at (573) 751-6133 will provide information on suggested and required immunizations for foreign travel. Travelers should call to request this information well in advance of departure date.

The following is a list of yellow fever vaccination centers in Missouri as of January 1997:

TEAR OUT FOR FUTURE REFERENCE

Joplin City Health Department
513 Kentucky Avenue
Joplin, MO 64801
Ph: (417) 623-6122
Thurs. morning, 10 a.m. by appointment

Don S. Overend, M.D.
Smith-Glynn-Callaway Clinic
3231 South National Street
Springfield, MO 65807-7396
Ph: (417) 883-7422
Mon.–Fri., 8 a.m. to 5 p.m.
Sat., 8 a.m. to noon

Stephen D. Christiansen, M.D.
Ozark Medical-Surgical Associates, Ltd.
1900 South National, Suite 2800
Springfield, MO 65804
Ph: (417) 881-8819

Springfield-Greene County Health Center
227 East Chestnut
Springfield, MO 65802
Ph: (417) 864-1686
By appointment only

Clay County Health Department
1940 - 152 Highway
Liberty, MO 64068
Ph: (816) 781-1601
Mon., 2:30 p.m. by appointment

Allen J. Parmet, M.D., M.P.H.
Midwest Occupational Medicine
Union Hill Commons
3037 Main, Suite 201
Kansas City, MO 64108
Ph: (816) 561-3480

Hansa N. Patel, M.D.
Natu B. Patel, M.D.
Bethany Medical Clinic
Box 506, South 69 Hwy.
Bethany, MO 64424
Ph: (816) 425-3154

Kevin Suttmoeller, D.O.
Academic Medicine, Inc.
800 West Jefferson
P.O. Box 1029
Kirksville, MO 63501
Ph: (816) 626-2206

University of Missouri
Student Health Services
University of Missouri Campus
South 6th Street
Columbia, MO 65201
Ph: (573) 882-7481
Mon.–Fri. or Sat. by appointment

(continued on page 12)

Yellow Fever Vaccination Centers

(continued from page 11)

Donald P. Miller, M.D.
Internal Medicine, Inc.
St. Mary's Medical Plaza
Suite 302
Jefferson City, Mo 65101
Ph: (573) 636-7183

Philip Whatley, M.D.
New Tribes Mission
Medical Center
P.O. Box 1348
Camdenton, MO 65020
Ph: (573) 346-5656
Not open to the public

Dr. Vladimir Gelfand
Deaconess Medical Center
Clarkston Square Shopping Center
1751 Clarkson Road
Chesterfield, MO 63017
Ph: (314) 537-0377

James H. Hinricks, M.D.
Edward F. Hendershot, M.D.
Northwest Infectious Disease
Services, LLC
DePaul Professional Office
Building
12255 DePaul Drive
Suite 250
Bridgeton, MO 63044-2585
Ph: (314) 344-7070

Barnes Care
5000 Manchester
St. Louis, MO 63110
Ph: (314) 531-5078

Barnes Care (Downtown)
401 Pine St.
St. Louis, MO 63102
Ph: (314) 621-4300

Barnes Care West
11501 Page Service Road
St. Louis, MO 63146
Ph: (314) 993-3014
Mon.–Fri., 8 a.m. to 4 p.m.

St. Louis County Department of
Community Health and Medical
Practice
John C. Murphy Health Center
6065 Helen Avenue
Berkeley, MO 63134
Ph: (314) 854-6410 Ext. 6321
Mon.–Wed., 8 a.m. to 4 p.m.
Thurs., 8 a.m. to 7 p.m.
St. Louis County residents only

Trav-L-Med, Inc.
12818 Tesson Ferry Road
Suite 101
St. Louis, MO 63128
Ph. (314) 849-6611

David C. Campbell, M.D., M.Ed.
Family Medicine Program
Deaconess Hospital
6125 Clayton Avenue, Suite 222
St. Louis, MO 63139
Ph: (314) 768-3685

Farrin A. Manian, M.D., M.P.H.
David A. Janssen, M.D.
Adult Infectious Diseases
621 S. New Ballas Rd., Suite 3002
St. Louis, Mo 63141
Ph: (314) 569-6171

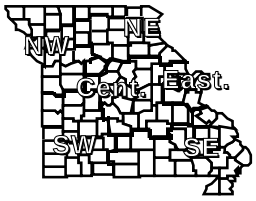
Victoria Fraser, M.D.
Infectious Disease
Washington University
School of Medicine
Box 8051, 660 S. Euclid
St. Louis, MO 63110
Ph: (314) 362-4412

Ann Nicolazzi, M.D.
Health Line Corporate
Health Services
1212 S. Grand
St. Louis, MO 63104
Ph: (314) 577-8060

Kirby Turner, M.D.
Kneibert Clinic
686 Lester, P.O. Box 220
Poplar Bluff, MO 63902-0220
Ph: (573) 686-2411

William C. Shell, M.D.
Ferguson Medical Group
1012 N. Main Street
P.O. Box 1068
Sikeston, MO 63801-5097
Ph: (573) 471-0330

Travelers' health information is available via Internet on the Centers for Disease Control and Prevention homepage at http://www.cdc.gov/ Choose the Travelers' Health menu to access guidelines for international travel. All material in the Travelers' Health menu is in the public domain, and may be used and reprinted without special permission. However, citation as to source is appreciated.



Missouri Department of Health
Division of Environmental Health and Communicable Disease Prevention
QUARTERLY REPORT

Reporting Period *
July - September, 1996

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	3 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1996	1995	FOR 1996	FOR 1995	5 YR MEDIAN
Vaccine Preventable Dis.																
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	0	0	0	0		0	0	0	0	0	1	0	7	7
Hib Other Invasive	0	0	0	0	0	1		0	0	1	0	2	2	7	12	32
Influenza	2	0	0	0	0	0		0	0	0	0	2	0	116	302	163
Measles	1	0	0	0	0	0		0	0	0	0	1	0	3	1	1
Mumps	1	0	1	2	0	0		0	0	0	0	4	5	5	22	32
Pertussis	8	0	3	0	2	3		7	2	1	0	26	25	40	42	59
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	0	0	1
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	1	1	0
Viral Hepatitis																
A	45	10	18	22	131	25		33	28	19	40	371	466	878	1073	872
B	11	1	1	1	6	1		8	11	2	2	44	113	167	334	374
Non A - Non B	3	0	2	0	0	1		3	0	2	0	11	7	31	18	21
Unspecified	0	0	0	0	0	0		0	0	0	0	0	0	0	1	9
Meningitis																
Aseptic	7	2	2	5	0	3		6	2	5	0	32	155	80	220	203
Meningococcal	3	0	5	0	0	0		0	0	3	0	11	11	53	36	28
Enteric Infections																
Campylobacter	18	8	25	19	32	19		9	3	40	15	188	233	420	501	492
Salmonella	26	5	25	21	24	16		6	9	25	4	161	224	375	420	413
Shigella	5	1	19	15	3	9		3	3	18	4	80	317	303	797	543
Typhoid Fever	0	0	0	0	0	0		1	0	0	0	1	1	2	2	2
Parasitic Infections																
Amebiasis	0	0	1	1	1	0		0	2	1	0	6	6	18	12	22
Giardiasis	23	15	45	15	31	24		7	5	34	20	219	241	521	476	512
Sexually Transmitted Dis.																
AIDS	10	4	4	9	11	6	1	39	77	48	7	216	236	598	568	194
Gonorrhea	60	13	127	130	73	27		612	694	386		2122	2974	6315	8704	9908
Prim. & Sec. syphilis	0	0	0	5	1	0		0	29	5		40	152	183	498	792
Tuberculosis																
Extrapulmonary	0	0	0	1	1	0	0	2	5	3	2	14	11	26	31	31
Pulmonary	3	1	5	3	2	1	0	13	14	3	3	48	41	125	134	145
Zoonotic																
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	0	1	0	1
Rabies (Animal)	1	0	0	1	1	0		0	0	0	1	4	6	17	25	25
Rocky Mtn. Sp. Fever	1	0	2	0	1	0		0	0	0	1	5	18	14	24	19
Tularemia	3	0	0	1	1	0		0	0	0	0	5	12	8	22	22

TEAR OUT FOR FUTURE REFERENCE

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis - 15
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 3
Legionellosis - 2
Leptospirosis - 1
Lymphogranuloma Venereum
Malaria - 3
Plague
Rabies (human)
Reye Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome
Trichinosis

Outbreaks

Foodborne - 2
Waterborne
Nosocomial
Scabies - 2
Other
Giardia - 4
Hepatitis A - 1
Shigella - 1
E. coli O157:H7 - 1
Legionnellosis - 1
Salmonella - 2

*Reporting Period Beginning June 30, Ending September 28, 1996.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions

Due to data editing, totals may change.

Pneumococcal Vaccine—Increased Usage Needed

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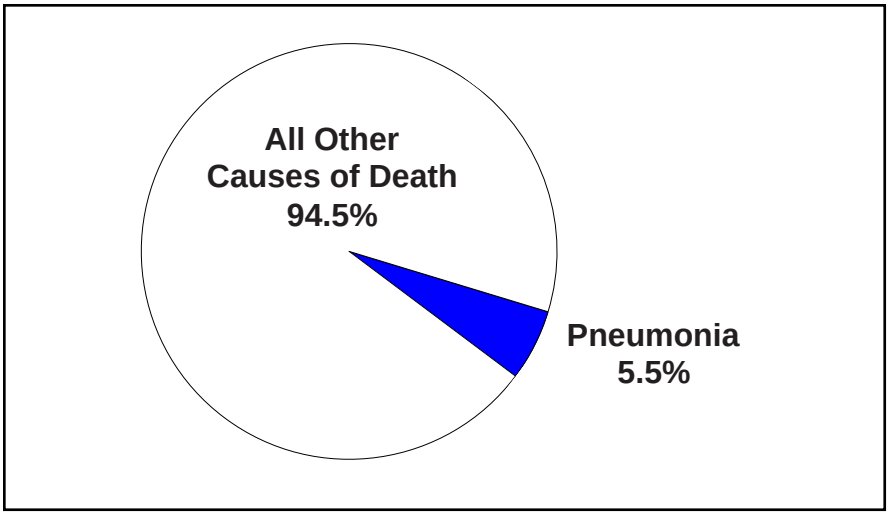

Figure 1. Percentage of total deaths due to pneumonia, Kansas City, Missouri, January–August 1996.

Pneumonia, whether acquired in the community or nosocomially, remains a serious disease condition and is a major cause of mortality.[1] Pneumonia accounted for 5.5 percent of the 3,649 deaths that occurred in Kansas City from January–August 1996. See Figure 1. In a meta-analysis of 122 studies involving more than 33,000 patients, it was found that mortality ranged from 5 percent in studies that covered ambulatory and hospitalized patients and 14 percent for studies that included only hospitalized patients to 31 percent for nursing home residents and 37 percent for intensive care unit patients. Men were more likely to die than women as were patients with certain disease conditions such as diabetes mellitus, neoplastic disease and tachypnea. Mortality was strongly associated with the cause of pneumonia, with bacterial infections, in general, carrying five to seven times the risk of viral infections.

Another recent study found that the case fatality rate for community acquired pneumonia was 7–9.7 percent with significant risk factors being that the person was ≥65 years old or infected with the human immunodeficiency virus or had a high severity of illness.[2]

The American Thoracic Society published a consensus statement on the diagnosis, assessment of severity, initial antimicrobial therapy and preventative strategies for hospital-acquired pneumonia in adults.[3] According to that publication, hospital-acquired pneumonias occur at a rate of 5-10 cases per 1,000 admissions, with the incidence increasing by as much as 6-20 times in patients who are being ventilated mechanically. Pneumonia currently is the second most common nosocomial infection in the United States and has the highest morbidity and mortality. Its presence increases hospital stay by an average of 7–9 days per patient.

Of the various etiologic agents of pneumonia, *Streptococcus pneumoniae* is the leading cause of fatal bacterial pneumonia in developing countries and now accounts for significant morbidity and mortality due to infectious diseases of the respiratory tract, sepsis and meningitis in the United States and other developed countries. It causes an estimated 3,000 cases of meningitis, 50,000 cases of bacteremia, 500,000 cases of pneumonia, and more than seven million cases of otitis media each year in the United States alone.[4] Pneumococcal disease has a consistent preference for males that remains unexplained. Alcoholism is also a predisposing factor for pneumococcal pneumonia with infections being more severe and prolonged.[5]

The capsular serotype of *S. pneumoniae* is the most important subclassification of the species because it has the strongest known influence on human immunity.[6] Susceptibility to invasive disease is determined by the ability of the host to generate specific opsonizing antibody against capsular antigens. Any one serotype will be at an advantage if the homologous antibody response in the host is blunted either by lack of previous exposure or by variation in the maturation of humoral immunity with age.

An important determinant of the ecological success of *S. pneumoniae* is its ability to transfer from one host to another in different environments. The density, age structure and socioeconomic conditions of human populations all affect the indices of transmission, namely the incidence of pneumococcal pneumonia, the number of effective contacts (i.e., contact between two individuals in which transmission occurs) per case, the prevalence of carriers, and the rate of effective contact between carriers and uninfected individuals.[6] Since there is marked variation among serotypes of *S. pneumoniae* in their propensity to colonize the nasopharynx they exploit different human environments with varying degrees of success. The geographic distribution of a serotype is likely to reflect the environmental characteristics that most suit its transmission.

Prior infection by respiratory viruses and exposure to cold weather have been regarded as factors that predispose to pneumococcal pneumonia. A recently published study of a community-wide sur-

veillance program in Houston examined the relationship of invasive pneumococcal disease to season, atmospheric conditions and the rate of respiratory virus isolation.[7] For children, the correlations tended to be stronger for events that occurred one month previously than for those that occurred contemporaneously and was consistent with the concept that viral or allergic events predispose to otitis media with effusion which becomes suppurative and leads to pneumococcal bacteremia or meningitis. For adults, a more immediate predisposition to pneumococcal pneumonia and bacteremia because of viral infection or air pollution was suggested.

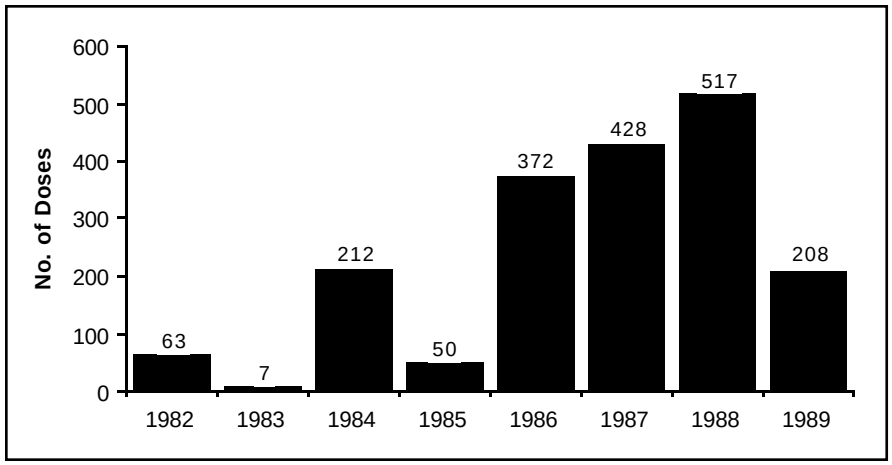

Figure 2. Pneumococcal vaccine doses administered, Kansas City, Missouri health department, 1982–89.

There are ≥90 serotypes of *S. pneumonia*e and 23 of these have been incorporated into a pneumococcal polysaccharide vaccine. These 23 serotypes are responsible for 85–90 percent of bacteremic infections. The vaccine is recommended for persons ≥2 years of age who are at increased risk of pneumococcal disease and its complications because of underlying health conditions. *(Pneumococcal vaccines for persons ≤2 years of age are in phase III clinical trials and could be available within 5 years.*[8]*)* In addition, the vaccine is recommended for older adults including all those ≥65 years of age. A booster dose every three to five years is recommended for persons at especially high risk of fatal pneumococcal infection, e.g., splenic dysfunction or asplenia. Revaccination of other persons should be considered if ≥6 years have elapsed since initial vaccination. Pneumococcal vaccine can be administered with other vaccines.

Since late 1977, the Kansas City Health Department and others have advocated the use of pneumococcal vaccine, yet there remained controversy within the medical community over its value.[9] The vaccine is efficacious in healthy adults, however, questions regarding efficacy in high risk populations and older individuals led to reluctance to use it. A study at two medical facilities in Florida examined what were the barriers to pneumococcal vaccination by house staff.[10] Although most physicians (94%) knew of the usefulness of the vaccine, many (66%) failed to translate this knowledge into clinical practice. The majority of physicians (70%) were not confident about their knowledge regarding vaccine guidelines and 61% had an exaggerated fear of hypersensitivity reactions. Neither the expense of the vaccine nor adverse publicity were impediments to immunization. 'Pressing' clinical issues were viewed by over half of the physicians as barriers to vaccination and, consequently, they placed the practice of preventive medicine into a subordinate position. Yet, recent observational studies in older individuals have confirmed and quantified the effectiveness of pneumococcal vaccine in situations of actual use.[11] Pneumococcal vaccine became a covered Medicare benefit in 1981 and economic data indicate that under realistic situations it is likely to reduce costs for health care systems with a net savings of $141 to a third-party payer per person vaccinated.[12]

With the ominous emergence of antibiotic resistant *S. pneumoniae,* not only is morbidity and mortality likely to increase sharply, there will be increased costs involved in treating these infections.[4] *S. pneumoniae* had been almost uniformly susceptible to penicillin. However, with the development and worldwide spread of drug-resistant *S. pneumoniae* (DRSP) a public health challenge has arisen. The prevalence of pneumococcal resistance to antimicrobial drugs is not known for most areas of the United States since DRSP infection has not been a reportable condition. Some studies have suggested great geographic and temporal variation in levels of resistance with prevalence rates of 2-30 percent.[13] Within communities, the proportion of pneumococcal illnesses caused by DRSP among children may be markedly different from that among adults. Consequently, communities with high levels of antimicrobial resistance and persons at highest risk of infection would benefit from efforts to raise the level of immunization against *S. pneumoniae*.

Pneumococcal and influenza vaccines are the cornerstones of an adult immunization program. They are cost saving or cost effective under many conditions and are clearly life saving. Attention should be directed to methods of increasing vaccine use in the elderly, and to better define better the societal and economic benefits of use in other segments of the population in which effectiveness has been long recognized.[11] Towards that end, the Missouri Patient Care Review Foundation is actively campaigning for health care providers to increase the utilization of pneumococcal and influenza vaccines among their Medicare clients. (For further informa-

(continued on page 23)

Opportunities for Improving the Care of Patients with Community-Acquired Pneumonia

Gary Fortune, D.O., M.P.H.
Dan Jaco, M.A., M.S.P.H.
Michael Boechler, Ph.D.
Theresa Luebbering
Susan Elder, M.A.
Missouri Patient Care Review Foundation

Tremendous potential exists for significantly improving the treatment of Medicare patients hospitalized with community-acquired pneumonia (CAP). Recent collaborative quality improvement efforts between the Missouri Patient Care Review Foundation (MPCRF) and five hospitals in the state are demonstrating that self-monitoring by the facilities of their treatment processes, along with ongoing analysis, can positively enhance the outcomes and quality of care for patients admitted with CAP.

In Missouri, CAP is the second leading cause of hospital admissions in the Medicare population. In calendar year 1993, more than 18,000 Medicare patients were admitted to acute care hospitals with a principal diagnosis of pneumonia (ICD-9-CM codes 480–486). These pneumonia admissions represented 6.6 percent of all Medicare admissions during the same period. Statewide, the case fatality rate was 9.6 percent (range = 0, 20.7) with an average length of stay (LOS) of 8.2 (range = 1, 135) days.

Based on the initial statewide analysis, summarized above, MPCRF conducted pattern analysis to determine variation in provider mortality rates and average LOS for CAP patients. Selected hospitals, whose mortality rates and/or LOS were statistically different from the statewide rates and/or LOS, were contacted regarding participation in an improvement project. Based on this solicitation, four hospitals agreed to collaborate in a pneumonia project. A fifth hospital contacted the Medicare peer review and quality improvement organization (PRO) and volunteered to collaborate on the pneumonia LOS project.

MPCRF's collaboration with the five hospitals focuses on process changes, as well as outcomes associated with the initial evaluation and treatment of CAP. These efforts are being conducted in conjunction with the Health Care Quality Improvement Program (HCQIP), designed to promote the quality, effectiveness, efficiency and economy of services to Medicare beneficiaries. Two of the five hospitals are participating in a project designed to reduce the mortality due to CAP; the other three, in a project to reduce the length of stay for CAP patients.

Background for the CAP Projects

In April 1993, an article was published in the *Quality Review Bulletin* (QRB), which described the results of the efforts of a community hospital to implement a critical pathway for CAP, based on severity of illness.[1] The study addressed the importance of specific process changes, including prompt antibiotic administration, in significantly reducing in-hospital mortality, length of stay, and total charges. Based on the findings of medical record reviews and subsequent discussions, the hospital's multidisciplinary task force made the following management and process-related recommendations for all CAP patients admitted through the emergency room (ER):

- Obtain sputum cultures on all patients.
- Draw blood culture twice.
- Administer antibiotics within four hours.
- Use antibiotics that cover *Mycoplasma* and *Legionella* (e.g., macrolides).

The recommendations emphasized that the above should be carried out as soon as possible, preferably while the patient is still in ER. In addition, a pulmonary and infectious disease consultation was encouraged if no improvement occurred within 48 hours. Eighteen months after implementing these process changes, pneumonia mortality rates and LOS for pneumonia decreased significantly at the community hospital.

The American Thoracic Society (ATS) also drew attention to this topic with the publication in November 1993 of guidelines for the initial management and treatment of adults with CAP.[2] The ATS guidelines, which take into account the limitations of diagnostic testing to identify specific pathogens, recommended that initial patient management be based on an assessment of the severity of the patient's illness and rapid initiation of empirical, severity-based antibiotic treatment, under the assumption that certain pathogens are likely causing the infection.

In February 1994, MPCRF convened a special study group, including two pulmonary disease specialists, to review and discuss the ATS guidelines and the QRB article. The result was an endorsement by the study group of both the ATS guidelines and the specific process changes recommended in the QRB article to form the basis for a local (within-state) improvement project. The study group recommended, however, that the project focus only on bacterial CAP. Based on this recommendation, case definitions for purposes of data collection and analysis were narrowed to the ICD-9-CM codes for bacterial pneumonia (481–483.8, 485 and 486).

Project Implementation

An initial task was the collection of baseline data for the selected hospitals to determine the extent of compliance with the ATS guidelines and QRB pro-

cess recommendations. The subsequent analysis of these data, abstracted from medical records of discharges occurring prior to the collaborative process changes at the hospitals, indicated less than desirable compliance with most of the practice recommendations. See Table 1. Utilizing this information on a provider-specific basis, each of the five hospitals developed and initiated a plan to improve its process for the care and treatment of patients who present with CAP at time of admission.

In addition to implementing certain process changes, the collaborating hospitals also agreed to complete data collection forms for each Medicare CAP patient admitted for a specified period of time and to submit these data to the PRO on a monthly basis. The information is currently entered into a database by MPCRF staff, allowing for analysis and the production of feedback reports that are subsequently shared with the collaborating hospitals to assist them in monitoring their process improvement.

Claims Analysis Results

A preliminary analysis recently conducted on the two outcome measures, patient mortality and length of stay, suggests that there has been improvement. Figure 1 displays the baseline and post-intervention mortality results of claims analysis for the two hospitals participating in the CAP mortality project. In the graph, the *baseline* figures represent the aggregate bacterial CAP discharges for the two hospitals during a one-year time period, prior to the implementation of any process changes. The *post-intervention* results, also based on aggregate claims, represent bacterial CAP discharges occurring **after** the process changes were implemented. Although the latter represents only a portion of a calendar year, it is encouraging to observe a downward trend in mortality from an initial baseline rate of 14.0 percent to a preliminary post-intervention rate of 8.7 percent.

(continued on page 18)

Table 1. Aggregate Baseline Data for Five Hospitals Participating in Community-Acquired Pneumonia (CAP) Projects, 1993

Indicators	Baseline
Cases with "Severe" CAP	78.7% (499)
Mortality	12.0% (76)
Average Length of Stay	10.16 days
Admitted From Home	66.3% (420)
Admitted From Nursing Home	32.0% (203)
Admitted Through ER	71.9% (456)
Within 4 Hours of Presentation:	
Sputum Gram Stain Obtained	18.8% (119)
Sputum Culture Obtained	19.1% (121)
Blood Cultures Obtained	48.0% (304)
Within 48 Hours of Presentation:	
Chest X-ray Positive for Infiltrate	80.8% (512)
Antibiotic Administered Within 4 Hours of Presentation	50.8% (322)
First Dose Administered:	
In ER	20.7% (131)
Average Time for Administration	2.68 hours
On Floor	74.8% (474)
Average Time for Administration	6.00 hours
In ICU	3.8% (24)
Average Time for Administration	5.12 hours
"Severe" Cases Receiving a Macrolide	8.0% (40)
Total Number of Cases	**634**

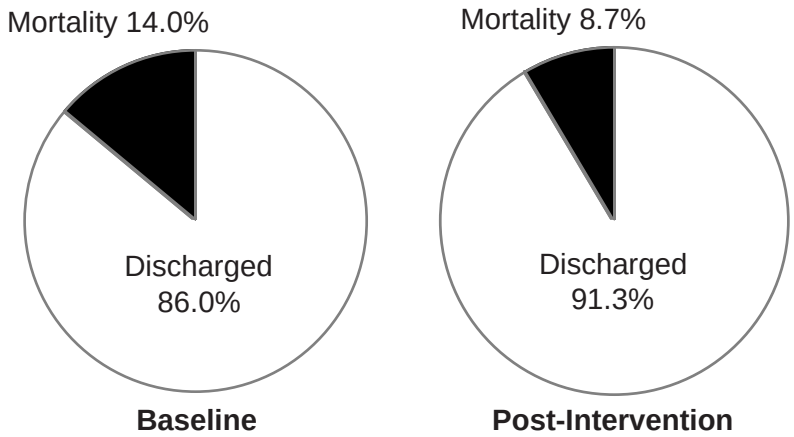

Figure 1. Baseline and post-intervention mortality results of claims analysis for two hospitals participating in community-acquired pneumonia mortality project, 1993.

(continued from page17)

Analysis of the claims data for the pneumonia LOS project also suggests improvement in outcome. As shown in Figure 2, which displays the baseline and post-intervention results of claims analysis for the three hospitals participating in the LOS project, length of stay appears to have been reduced from an average of 10 days to 8.5 days.

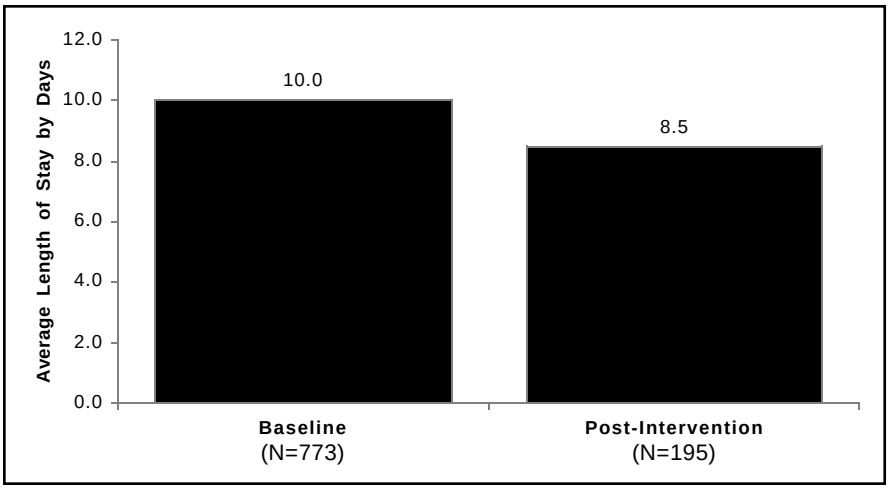

Figure 2. Baseline and post-intervention results of claims analysis for three hospitals participating in length of stay project, 1993.

The preliminary results suggest that the monitoring of key process indicators, with ongoing analysis and feedback to the collaborative facilities, has potential for facilitating positive change in the quality of care for CAP patients. Based on the early indications of success with this project, MPCRF will be undertaking another project, with a different but slightly larger group of providers, focusing on improving both LOS and mortality associated with CAP.

MPCRF is the federally designated Medicare peer review and quality improvement organization for Missouri under a contract with the Health Care Financing Administration (HCFA). Conclusions and opinions expressed, as well as the methods used, are those of the authors and do not necessarily reflect HCFA policy or perspectives. The authors assume all responsiblity for the accuracy and completeness of the PRO data used.

NOTE: *MPCRF would like to acknowledge Pierrette Bentivegna, M.P.H. for her earlier work on the project.*

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Tuberculosis Awareness Fortnight

Each year the American Lung Associations of Eastern and Western Missouri, along with the Missouri Department of Health, Bureau of Tuberculosis Control, co-sponsor Tuberculosis Awareness Fortnight. This upcoming event is scheduled to take place March 9–22, 1997.

Tuberculosis Grand Rounds are planned in Kansas City on Friday, March 21, 1997. One is scheduled at St. Luke's Hospital in Kansas City at 8:00 a.m. and the other will be held at the University of Missouri-Kansas City School of Medicine (Truman Medical Center) at 12:00 noon.

For further information regarding these and other events, or to obtain additional information or literature on tuberculosis, please contact:

American Lung Associations
of Eastern and Western Missouri
(800) LUNG-USA
or
Bureau of Tuberculosis Control
(573) 751-6122

Update on Viral STDs: Genital Herpes and Human Papillomavirus March 20, 1997

7:00–9:00 a.m. or 11:00–1:00 p.m., CST

This national satellite teleconference is co-presented by the St. Louis STD / HIV Prevention Training Center. This continuing education program for health care professionals is offered free of charge. Downlink sites in Missouri are in Independence, Jefferson City, Macon, Poplar Bluff, St. Louis and Springfield.

For more information or to register, please call (314) 747-1522.

Decline in SIDS Deaths

Janice Bakewell
Bureau of Health Data Analysis

Sudden Infant Death Syndrome (SIDS) is the leading cause of death in infants older than 1 month and less than 1 year of age, accounting for 42 percent of post-neonatal deaths among Missouri resident births during the period from 1990–95. However, over this six-year interval, the SIDS rate has fallen by nearly 50 percent.

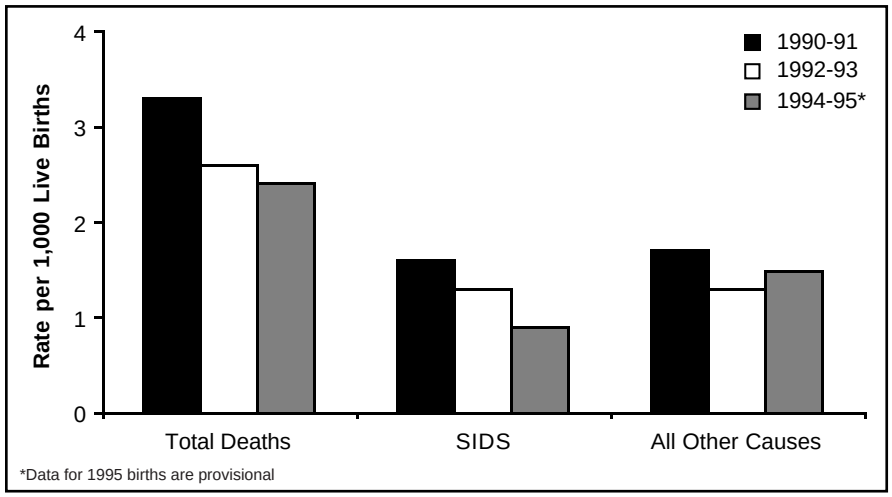

Figure 1. Mortality Rates per 1,000 Live Births Among Infants Older Than 1 Month of Age by Cause of Death and Year of Birth, Missouri, 1990–95.

In June 1992, the American Academy of Pediatrics issued recommendations that most healthy infants be placed to sleep in a supine or lateral (back or side down) position in order to reduce the risk of SIDS. There was considerable resistance among some physicians to recommend this change from the prone (stomach-down) position traditionally favored in the United States.[1–3] Among justifications cited by some physicians for avoidance of the supine position were the perceived risk of aspiration of stomach contents and concerns about the applicability of findings from other countries to the United States population. In January 1994, at an international conference on SIDS, data were presented indicating that the earlier observed reductions in SIDS associated with a change in sleep position had been sustained, and the increased number of infants sleeping in the supine position had not been associated with any harmful consequences.[4–5] As a consequence, the supine position is now more widely accepted. Survey data show a nationwide decrease of the prone sleeping position, from 73 percent in 1992 to 29 percent in 1995.[6]

A Missouri development that may have had an impact on reported SIDS rates was enactment of legislation, implemented in January 1992, mandating autopsies, death scene investigations, and multi-disciplinary (e.g., physician, law enforcement, and social services) child-fatality review team investigation of all sudden, unexplained child deaths. Because SIDS is a diagnosis of exclusion, the implementation of these measures in Missouri had the potential for causing a number of infant deaths which might previously have been classified as SIDS to be assigned other causes of death, e.g., previously undiagnosed diseases, accidental suffocation or homicide.

We studied SIDS deaths among 1990–95 Missouri resident births. The data for 1995 births are provisional, but because 96 percent of SIDS deaths among 1990-94 births occurred within the first six months, we believe the data are nearly complete. That is, most if not all SIDS deaths in infants born in 1995 had occurred within the first six months and their death certifcates were included in the data set when this study was undertaken.

(continued on page 20)

Table 1. Number and Rate of SIDS Deaths and Percentage Autopsied by Race and Year of Birth, Missouri Resident Births, 1990–95

Year of Birth	Number of SIDS Deaths			SIDS Mortality Rate per 1,000 Live Births			Percent of SIDS Deaths Autopsied		
	Total	Non-Black	Black	Total	Non-Black	Black	Total	Non-Black	Black
1990	132	85	47	1.7	1.3	3.5	86	80	96
1991	144	100	44	1.8	1.5	3.1	94	93	98
1992	109	87	22	1.4	1.4	1.7	100	100	100
1993	110	78	32	1.5	1.3	2.5	100	100	100
1994	80	59	21	1.1	1.0	1.8	100	100	100
1995*	67	55	12	0.9	0.9	1.1	100	100	100

*Data for 1995 births are provisional

(continued from page 19)
SIDS deaths and rates per 1,000 births by year of birth and race are presented in Table 1. From 1990–95, Missouri SIDS deaths fell from 132 to 67, and the rate fell by 47 percent, from 1.7 to 0.9 per 1,000 live births. SIDS rates fell earlier and more sharply among blacks. In 1990, blacks were 2.7 times as likely to have a SIDS death than non-blacks, while the gap for 1995 narrowed to 1.2.

The extent to which the decrease in reported SIDS cases represents fewer lives lost rather than a reclassification of deaths cannot be quantified. The percent of reported SIDS cases that were autopsied are presented in Table 1. Prior to 1992, although not all SIDS cases were autopsied, the autopsy rate was still very high, particularly among black SIDS deaths.

Table 2. Adjusted Relative Risk of SIDS for Selected Characteristics, Missouri Resident Births, 1990–95

Characteristic	Adjusted Relative Risk†	95% Confidence Interval
Black	1.13	0.90–1.37
Low Birth Weight (<2,500 grams)	2.10	1.88–2.32
Male	1.88	1.71–2.05
Maternal Smoking*	2.31	2.13–2.48
Maternal Age <20*	1.95	1.70–2.19
2nd–3rd Birth	2.50	2.28–2.72
4th+ Birth	3.19	2.89–3.48
Maternal Education <12 yrs*	1.31	1.12–1.51
Late/No Prenatal Care	1.27	1.05–1.47
Unmarried Mother*	1.52	1.32–1.73
Non-metropolitan Residence*	1.02	0.84–1.20

† Relative risk after adjusting for birth year and all other variables, in comparison to reference group listed in Table 3, e.g., for blacks, adjusted relative risk in reference to non-blacks; for 2nd–3rd and 4th+ births, adjusted relative risk in reference to first births.
* Maternal characteristic at birth

Figure 1 shows overall mortality rates and mortality rates due to SIDS and all other causes, for infants 1–6 months of age (the age range within which 90 percent of SIDS deaths occur). The overall mortality rate and the rate of deaths due to causes other than SIDS also fell during the time period from 1990–95. We additionally examined other subcategories of causes of mortality, such as homicide and other injuries, without finding major increases that would suggest an important trend toward reclassification of deaths. Thus, it seems that most of the decrease in reported SIDS cases actually reflects a decline in the incidence of this condition.

We examined the incidence of SIDS among 1990-95 births by selected risk factors for which data are available (sleep position was not available). Through multiple logistic regression we obtained the adjusted relative risk (ARR) and 95 percent confidence interval (CI) for the risk of SIDS for a given risk factor, after adjusting for birth year and the other risk factors in the logistic regression model. These data are presented in Table 2.

Table 2 shows that within the 1990-95 time period, a 1.13 ARR for black births was observed, which was not statistically significant because the CI includes 1.00. Low birth weight (less than 2,500 grams) was associated with a 2.10 ARR, or twice that of normal-weight births, and male sex was associated with an ARR of 1.88; both of these associations were statistically significant. These three variables–black race, low birth weight and male sex– have been shown elsewhere to be important risk factors for SIDS.[5] Maternal smoking and low maternal age are other important risk factors for SIDS. Maternal smoking in pregnancy was associated with a 2.31 ARR for SIDS. Both smoking in pregnancy and exposure to cigarette smoke after birth have been identified elsewhere as major risk factors for SIDS.[6] Infants of teen mothers have a 1.95 ARR in comparison with infants of older mothers.

The risk of SIDS increases with increased birth order. Second and third births have an ARR of 2.50 in comparison with first births; for fourth- and higher-order births the ARR is 3.19. The increase in risk with increasing birth order is statistically significant. Smaller but statistically significant ARRs were also observed for other risk factors: 1.31 for maternal education less than 12 years; 1.27 for infants of women receiving late prenatal care (after the fourth month of pregnancy) or no prenatal care; and 1.52 for infants of unmarried mothers. Each of these variables is associated with low socioeconomic status, shown elsewhere to be a risk factor for SIDS.[5,6] Non-metropolitan residence was not found to be a significant risk factor for SIDS.

Which groups benefited most from the decrease in SIDS rates between 1990 and 1995? We examined SIDS rates for 1990-91 and 1994-95 births by the presence or absence of risk factors previously discussed. The number and rate of SIDS deaths for each time period are presented in Table 3, along with the percentage that the SIDS rate decreased for 1994-95 births in relation to 1990-91 births. Because of the relatively small number of SIDS deaths, only unadjusted rates could be developed.

As previously discussed, SIDS rates decreased much more rapidly for blacks than for non-blacks. The 56 percent decrease in SIDS among blacks from 1990-91 to 1994-95 was the greatest decrease

Table 3. Number and Rate of SIDS Deaths by Year of Birth and Selected Characteristics with Percentage Decrease in Rates, Missouri Resident Births, 1990–95

Characteristic	SIDS Deaths by Year of Birth 1990–91	SIDS Deaths by Year of Birth 1994–95†	SIDS Mortality Rate per 1,000 Live Births by Year of Birth 1990–91	SIDS Mortality Rate per 1,000 Live Births by Year of Birth 1994–95†	Percentage Decrease in SIDS Mortality Rate, 1990–91 to 1994–95
Non-black	185	113	1.4	0.9	35.4
Black	91	34	3.3	1.5	55.7
Non-LBW*	234	119	1.6	0.9	45.0
LBW*	42	27	3.6	2.4	33.4 NS
Female	87	65	1.1	0.9	18.9 NS
Male	189	82	2.4	1.1	53.5
Non-smoker**	136	85	1.1	0.7	36.0
Smoker**	139	61	3.6	2.1	43.2
1st Birth	60	42	1.0	0.7	26.5 NS
2nd–3rd Birth	158	75	2.0	1.1	47.5
4th+ Birth	57	29	3.5	2.0	43.3
Age 20+**	212	111	1.6	0.9	43.5
Age <20**	64	36	2.8	1.7	40.0
Early Prenatal Care	207	120	1.5	0.9	40.0
Late/No Care	60	24	3.1	1.9	37.5
12+ Years Education**	151	90	1.2	0.8	37.4
<12 Years Education**	116	54	3.5	1.9	44.9
Married**	133	74	1.2	0.7	37.3
Unmarried**	143	72	3.1	1.5	50.7
Metropolitan Resident**	161	83	1.7	1.0	41.9
Non-Metro Resident**	115	64	1.8	1.0	43.4
Total	**276**	**147**	**1.8**	**1.0**	**42.6**

† Data for 1995 births are provisional
* LBW=Low Birth Weight (<2,500 grams)
** Maternal characteristic at birth
NS Decrease in 1994–95 rate from 1990–91 rate is not statistically significant

observed among all subcategories studied. The 54 percent decrease among male infants was also dramatic, especially in comparison with the 19 percent, statistically insignificant, decrease for females. The 1994-95 data indicate that these historically important risk factors for SIDS may be becoming less important, but because of the small number of SIDS deaths, we cannot make that determination until more data become available.

Infants of unmarried mothers had a greater percentage decrease in the rate of SIDS than infants of married mothers (51 vs. 37 percent, respectively). This decrease reflects more than the differing racial makeups of the two groups; among both blacks and non-blacks, the decrease in rates was higher among births to unmarried mothers.

Although SIDS decreased among low-birth-weight infants, these infants remained especially vulnerable to SIDS. The SIDS rate among low-birth-weight infants decreased 33 percent, well less than the 45 percent decrease observed among normal-weight births. Low birth weight was the only risk factor for which no statistically significant decrease in the SIDS rate was observed between 1990–91 and 1994–95.

The SIDS rate associated with infants of mothers who smoked during pregnancy

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SIDS Deaths

(continued from page 21)
decreased 43 percent, while for infants of non-smokers a decrease of 36 percent was observed. Smoking in pregnancy decreased from 24.5 percent in 1990-91 to 20.4 percent in 1994-95. This resulted in the observed SIDS deaths for 1994-95 being about six percent lower than would have been expected had smoking rates remained at 1990-91 levels.

SIDS decreased more rapidly among higher-order births (48 and 43 percent for 2nd–3rd and 4th plus births, respectively) then among first births (27 percent), and a greater decrease was observed among women with less than 12 years education (45 percent) than among infants of mothers with high school education or more (37 percent). Comparable decreases were observed among infants of teen and non-teen mothers, early and late/no prenatal care recipients, and metropolitan and non-metropolitan residents.

In summary, in recent years Missouri has experienced sharp decreases in the rate of SIDS among both high risk (such as black, male, low-birth-weight) and low risk infants, and among infants from both lower and higher socioeconomic groups. We assume that Missouri residents have followed the nationwide trend in the decline of prone sleeping position, and that avoidance of the prone sleeping position is the most important factor in the decrease, but reductions in smoking may have also contributed to the decline in SIDS cases. In addition, some of the decrease in SIDS in Missouri may reflect changes in cause of death recording rather than a true decrease in deaths.

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State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Jul 96	Aug 96	Total YTD
Specimens Tested	11,257	10,573	81,972
Initial (percent)	63.4%	63.4%	51,598
Repeat (percent)	36.6%	36.6%	30,374
Specimens: Unsatisfactory	175	164	1,244
HT Borderline	1,153	1,226	10,556
HT Presumptive	33	38	543
PKU Borderline	8	4	46
PKU Presumptive Positive	0	2	7
GAL Borderline	67	112	884
GAL Presumptive Positive	3	3	13
FAS (Sickle cell trait)	95	70	615
FAC (Hb C trait)	21	22	186
FAX (Hb variant)	16	17	110
FS (Sickle cell disease)	1	0	13
FSC (Sickle C disease)	2	1	8
FC (Hb C disease)	0	1	2

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

Meningococcal Disease in Southwest Missouri

(continued from page 3)
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Family Planning

(continued from page 10)
(from 17,947 in 1990 to 13,635 in 1995) and a 31.8 percent decline in births occurring to women within 18 months of a previous birth (from 6,303 in 1990 to 4,301 in 1995) indicating that some unintended pregnancies are being avoided. Another measure of success is the change in contraception that we are seeing as a result of family planning visits. Most clients leaving a family planning visit are practicing some form of contraception, and usually a method more effective than the one they were using prior to the visit.

An important part of the current effort in family planning is to provide services to those who are most in need of help to control their fertility. The overwhelming proportion of females utilizing public family planning services are those who are at highest risk for unintended pregnancy, and therefore, are the ones most in need of these services. Although the population distribution of Missouri females is changing as the baby boomers move out of the fertility range (15–44), the number of women in this age range will not decline to the 1980 level of 1,113,112 until 2005 when 1,100,634 are projected. Consequently, the need for family planning services will not only increase in the immediate future, but as the fertile range becomes more weighted toward the younger age groups, it may actually increase even more due to these age groups' higher levels of fertility and increased risks of unintended pregnancies. The individual and public benefits derived from the ability to control one's fertility and truly plan one's pregnancy so that each pregnancy is wanted, and therefore, cared for in the best possible circumstances are immense.

This description of clientele at family planning clinics is incomplete due to the percentage of unknowns for such key variables as education and income status as well as the lack of individual client data from the major metropolitan areas and other funding sources. Consequently, it is impossible to tell with any degree of certainty who public family planning is serving. If information from all public family planning providers and private physicians serving Medicaid were available, we would have some idea of met need for the most vulnerable population and from that we could get a better handle on unmet need.

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Pneumococcal Vaccine

(continued from page 15)
tion on this campaign, call 1-800-735-6776.) See related article on community-acquired pneumonia on pages 16–18 of this issue.

Through the 1980s, the Kansas City Health Department offered pneumococcal vaccine in conjunction with its annual influenza vaccination campaign. See Figure 2. However, inadequate and inconsistent funding limited the amount of vaccine that could be purchased and administered. This initiative ceased in 1990.

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VIDEO CONFERENCE

Adult Immunizations
April 24, 1997

The next CDC video conference will highlight successful adult immunization programs in different health care settings such as private practices and long-term care facilities. This video is designed to show programs that have been successful in reaching the adult population. The video conference is targeted to family practice physicians, internists, HMOs, public and private clinics and Medicaid and Medicare providers. The time for the teleconference has not been determined. Please mark the date on your calendar and watch for your registration form in the mail.

If you have questions, please contact Georgia Storm, Bureau of Immunization, at (573) 751-6133.

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The Managing Editor is H. Denny Donnell, Jr, MD, MPH, State Epidemiologist. Production Manager is Diane C. Rackers. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272

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This newsletter can be recycled.

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If you are a physician, physician assistant or veterinarian and are moving out of state and would like to continue to receive our newsletter, please let us know and we will add you to the mailing list we maintain. You are not included in the list of addresses we obtain if you live outside of Missouri.

If you are receiving duplicate copies of this newsletter and don't need them, please return this back page which contains your address and mark it "duplicate." We will delete the duplicate name from the mailing list we maintain.

We would like to maintain a mailing list which would allow us to make address corrections for everyone, but this would involve maintaining over 11,000 addresses and is not feasible.